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"The Gulf Between Science and Religion"

"There is a genuine gulf between science and religion as they are actually carried on today; no amount of good will or vague generalization will make it go away," writes John D. Garhart of Hartwick College while reporting a seminar convened by the Danforth Foundation and Pennsylvania State University in 1957, with references to previous seminars held annually 1953-56 *(The Christian Scholar,* 257 Fourth Ave., New York, June, 1958).

Since the 1920's with the Scopes trial "the shooting war between science and religion has been much abated." "Unfortunately the shooting war was replaced not by some fecund association between the erstwhile opponents, but by the withdrawal of both parties into a sort of tolerant neutrality."

Seminars during 1953-55 had made a broad and systematic effort, calling attention to "the need for some real rapprochement between the field of science and the field of religion." In 1956 the members of a seminar barely made a beginning exploring the topic, "The Natural Sciences: Their Nature and Relation to Religion." It was then recommended that consideration of the subject be continued in 1957. The thought was that a mature group with experience would "arrive at some conclusions."

Accordingly a group met in 1957 and lectures were delivered by Harold K. Schilling, professor of physics and dean of the graduate school of Pennsylvania State University, and by John Dillinger, professor of theology at the Harvard Divinity School.

"The leadership was splendid and the members of the group were both competent and congenial, but at the end of the session the hope of the previous year's optimists had vanished. We had no significant conclusions. Why?"

The seminar had met to explore "the nature, content, and the methodologies of both disciplines and their inter-relationships." "But it took us so long to reach a minimal understanding with regard to nature and methods that we had no time for effective exploration of the inter-relationships."

Progress was delayed as rapport was established. There were scientists who approached theologians with "caution," and there were theologians who approached scientists with "condescension."

The most hopeful way, apparently, of improving the situation was to "expose people to science and religion in actual operation." A visit to a scientific laboratory "provided us with a kind of understanding that our talk about science had lacked."

When Dr. Dillinger came "to grips with the question of the theological necessity of the doctrine of the Virgin Birth," he gave what "approximated an operational definition," and "was speaking a language familiar to scientists." "They gained insight into his thought." Dr. Dillinger was also able to contribute much because "he knows both science and religion from the side of practical experience as well as from the side of theory and theology."

Scientists seemed to have their greatest difficulty in understanding "the systematic structure and logical method that belongs to theology."

"Inter-relationship does not take place in general, but operates at particular points of contact."

The group did not arrive, but furnished a record of its travels, hoping that they will "form a part of the march toward a genuine rapprochement. . . ." "We had formed new friendships, gained new perspectives, and carried with us the conviction that seeds had been planted from which something of significance was likely to grow."

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The Gulf Between the Sciences and the Arts

"There are today few who succeed in bridging the gulf" between the sciences and the arts, states the leading article in *The Times Literary Supplement,* London, August 15, 1958. "Only in our time has the gulf between science and the arts become serious, and the reason is not far to seek. It lies in the increasing specialization [in education] . . ." that affects both the sciences and the arts.

"Yet the criterion that makes one human activity an

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art and another a science has never been satisfactorily settled. . . . Perhaps the explanation is that there is no fundamental difference. If there is, it certainly does not lie in the subject-matter. Both the humanities and the sciences take the whole world for their province. . . . The starry heavens above can keep both the musician and the astronomer out of their bed at night.

"It is not a difference, as is sometimes suggested, between particularity and universality. The man of science, it is true, hopes that in discovering a theorem or enunciating a law he is proclaiming something that will be valid in all places and at all times. The artist, it is equally true, catches his subject in a moment of its existence. But the hope of the man of science as often as not proves to be vain, for his assured results are revised out of all recognition in the next century; while the artist catches the moment for the sake of preserving it externally. The art of Leonardo da Vinci has proved far more permanent than the science of that same Leonardo. . . ."

It is sometimes said that the arts have to do with the emotions, "while science is an affair of the reason." The idea is "tempting but will not bear close examination." "Science obstinately refuses to be bound with mathematical chains," and for the poet and the musician "reason will keep intruding," and "there are lessons to be taught and ways to be justified."

Ours seems to be the first age that has looked for the sharp line of demarcation between the sciences and the humanites. A sharp antithesis would never have occurred to Aristotle. Swift is in the line of Aristophanes, but Swift was not ignorant of science—he protested "the cultivation of a science divorced from human needs." Wordsworth, Shelley, Browning, and Tennyson often found "their raw material in science."

Specialization in schools and colleges accounts for our own situation, it is claimed. One way out might be to teach the history of science as a part of general history, "for the world we live in is as much the product of science as of politics and economics." "This is one way in which history must be written if the worlds of science and the humanities are not to drift still farther apart.

"Science and Religion: A Necessary Partnership"

"The conclusion that science and religion are two ways of approaching . . . [the] central mystery of the universe . . . has been reached by many thoughtful men and women." "Today it is not enough, however, simply to reconcile these two contenders for our allegiance and to end their ancient controversies." There is need "for science to contribute to the purification and health of religion and for religion to exercise its gifts for the benefit of science." Thus spoke Edmund W. Sinnott, dean of the graduate school of Yale University and professor of botany, in one of the Lyman Beecher lectures in 1950 at Yale Divinity School, and printed in pamphlet form under the above title by The Edward W. Hazen Foundation, New Haven 11, Conn., 1951.

New revelations come both in science and religion. "Scientists are much like poets, after all; most of their great new ideas, their deepest insights into nature, have come as flashes of inspiration to minds prepared for them. These revelations accumulate to form the growing body of knowledge upon which man ascends to understanding. The days of revelation, for men of faith as for their brothers in the sciences, surely did not end two thousand years ago."

"A sympathy with the religious attitude toward the universe can save science from a too easy dogmatism. . . . The peril to science . . . is from a dogmatism more subtle than those which have so often been established by ecclesiastical authority. . . ."

"The line is hard to draw which separates a field of proper scientific inquiry, dealing with material and measurable things, from the wide realm around it of experience and feeling, with which science in the strict sense is not concerned. At the border line the two merge insensibly into each other. It is very important for the scientist to recognize the existence of this wider realm, for it is the setting in which his own work is placed. . . ."

Those committed to the religious way of life may aid science by interest in the use of the discoveries of science. "These are capable of ministering to our welfare in countless ways, but they can also do us gravest injury. The day is come when man has gained the power actually to destroy himself if he will. Whether his moral stature can rise to the demands made on it by the modern world is the gravest problem he is facing now."

"Science helps to nourish tolerance, friendliness, and good will among those who practice it. . . . Surely the major instrument in arousing the nobler emotions of mankind . . . is the benign and unselfish spirit which distinguishes religion at its best and which has always been the goal, however imperfectly realized, of the Christian Church."

"Can Science Provide an Ethical Code?"

"Science and scientific practice might be the source of ethical codes which incorporate such traditional scientific ideals as the unbiased search for truth, clarity and rigor of thought, perseverance, patience, and so on," Richard S. Rudner, who teaches philosophy at Michigan State University, writes in an article, "Can Science Provide an Ethical Code?" in *The Humanist,* Yellow Springs, Ohio, September-October, 1958.

Professor Rudner states that "the scientist, not merely as a citizen but as a scientist, makes value judgments; that the making of typically ethical value judgments is an integral part of the scientific method. . . ."

"I now believe that the value judgments a scientist ought to make are those which conform with what we might call the ethical code of science; and that code would be justifiably constituted out of the ethical practice of scientists as scientists. Thus, an ethical code *can* be justified solely by recourse to science. In particular, the ethical code of science could be so justified—in the twofold sense that it would be constituted by the codification of the ethical practices of scientists, and also that determining what those practices were would itself be wholly the province of some scientific discipline, presumably the Sociology of Science. . . .

"Science can provide an ethical code" in several ways. "It may do so inductively by providing the factual information which is necessary for choices of means and ends. It may do so emulatively, inasmuch as the ideals traditionally associated with it may be incorporated within ethical codes. The problem of whether it may do so deductively boils down to the problem of whether an ethical code may be justified solely by recourse to science. In order to resolve this problem, it is necessary to analyze the notion of justification in ethics; and that analysis reveals that

this notion is comparable to justification in deduction and induction. In the light of that analysis and of the fact that making ethical judgments is an integral practice of the scientist as scientist, it follows that there may be at least one ethical code so justified; namely, the ethical code of science itself."

A Parliament of Science

A Parliament of Science, convened in March, 1958, by the Council of the American Association for the Advancement of Science, Washington, has expressed "the collective judgment of a representative group of scientists on matters of public policy," as reported in *Science,* Washington, April 18th, 1958. Some 130 persons took part in a three-day meeting, and a group of laymen were among the participants.

Among general conclusions were the following: "Scientific endeavor is one phase of human intellectual effort; the degree to which it flourishes depends largely upon the extent to which intellectual effort generally is supported and encouraged. Optimal progress in science requires increased support for basic research. . . . Scientists must have the maximum possible freedom to communicate with each other, both in person and by publication, and to communicate with the public. In the assignment of funds to the improvement of education, first priority should go to improvements in curricula, teaching, and the status and salaries of teachers."

"Science is, at base and in reality, a response of man's intellectual curiosity to the order and beauty of the universe in which he finds himself. It is by no means the only response to that order and beauty, and hence science feels itself allied with, not opposed to, such other responses as the arts and humanistic studies."

Among the more specific conclusions: "Simply more money is not enough. Funds must be provided under conditions that encourage and support creativity."

"Universities should be models of freedom in our society where free inquiry and free expression in the arts and the humanities, as well as in the sciences, can go forward."

The Parliament favored "a mixed private-governmental system of support designed to bring the diverse judgments of large numbers of wise people to bear on a continuing series of difficult and significant problems."

As reported in *The Saturday Review,* New York, April 5, 1958, by H. Jack Geiger, a delegate arose to oppose approval of a proposed statement to the effect that current restrictions on international freedom of basic research "are often wrong and futile." The delegate asked for deletion of the word "wrong" stating that this was a moral judgment and that a Parliament of Science should not make this type of judgment. By a two-thirds vote the moral judgment was retained.

Mr. Geiger also reports that the Parliament declined to adopt this statement: "We cannot pretend to tap total human resources without recognizing that discrimination deters the members of minority groups from participating in education and science."

The Parliament requested the Association to call "future conferences of a similar sort" for the purpose of exploring "problems of science and public policy." The Board of Directors of the AAAS has voted "to commend the recommendations of the Parliament to the attention of all scientists."

"Innovation in Science"

On the cover of *Scientific American,* New York, September, 1958, an issue "solely concerned with the subject of innovation in science," according to an editorial note, "is a detail from Leonardo da Vinci's *Madonna of the Rocks.* In center is the infant Jesus, at left, part of the figure of the Madonna; at right an angel. As J. Bronowski says in the article which introduces this issue . . . , the scientific revolution was an integral part of the Renaissance. The loving care with which Leonardo rendered natural detail had a deep kinship with the scientist's insistence that the details of nature were significant. The painting is in the Louvre. . . ."

"The Creative Process" is the title of J. Bronowski's article. The great ages of Greece and of the Renaissance, usually known as important periods of literature and art, were times of scientific development. "We must surely ask whether this conjunction is accidental." "Is it a coincidence that, when Galileo was at the height of his intellectual power, there were published in England in the span of 12 years the following three works: the authorized version of the Bible, the first folio of Shakespeare, and the first table of logarithms. . . .

"The sciences and the arts have flourished together. And they have been fixed together as sharply in place as in time. In some way both spring from one civilization: the civilization of the Mediterranean, which expresses itself in action."

Leonardo da Vinci "took his artist's vision into science. He understood that science as much as painting has to find the design of nature in her detail."

"The power which the scientific method has developed has grown from . . . the procedure of induction. This procedure is useless unless it is followed into the detail of nature; its discovery therefore flows from Leonardo's vision.

"Francis Bacon in 1620 and Christian Huygens in 1690 set down the intellectual bases of induction. They saw that it is not possible to reach an explanation of what happens in nature by deductive steps. Every explanation goes beyond our experience and thereby becomes a speculation. Huygens says, and philosophers have sheepishly followed him in this, that an explanation should therefore be called probable. He means that no induction is unique; there is always a set—an infinite set—of alternatives between which we must choose.

"The man who proposes a theory makes a choice—an imaginative choice which outstrips the facts. The creative activity of science lies here, in the process of induction. For induction imagines more than there is ground for and creates relations which at bottom can never be verified. Every induction is a speculation and it guesses at a unity which the facts present but do not strictly imply.

"To put the matter more formally: A scientific theory cannot be constructed from the facts by any procedure which can be laid down in advance, as if for a machine. To the man who makes the theory, it may seem as inevitable as the ending of *Othello* must have seemed to Shakespeare. But the theory is inevitable only to him; it is his choice, as a mind and as a person among the alternatives which are open to everyone.

"There are scientists who deny what I have said—that we are free to choose between alternative theories. They grant that there are alternative theories, but they hold that the choice between them is made mechanically. . . .

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"A man becomes creative, whether he is an artist or a scientist, when he finds a new unity in the variety of nature. He does so by finding a likeness between things which were not thought alike before, and this gives him a sense both of richness and of understanding. The creative mind is a mind that looks for unexpected likenesses. This is not a mechanical procedure, and I believe that it engages the whole personality in science as in the arts. . . ."

J. Bronowski is a British scholar who has written many papers on mathematics, a life of William Blake, and two books on science, including *Science and Human Values*, reviewed in this SERVICE, Feb. 8th, 1958.

"The Mystery of Matter"

The contemporary efforts in the erection of the giant accelerators, called atom smashers, "are intended to advance one special aspect of physics, which we term particle physics," writes J. Robert Oppenheimer, the noted physicist, director of the Institute for Advanced Study, Princeton, N. J., in an article, title above, in *The Saturday Evening Post*, Philadelphia, July 5, 1958. "The aim here is to answer the fundamental question—of what is matter made?"

This special aspect of physics involves "problems of extraordinary difficulty" and also of "novelty and thus adventure." "Many signs indicate that if we can solve the problems involved, we shall have achieved new concepts of natural harmony and order."

It is an ancient idea that matter consists of atoms, but even at the beginning of the 20th century "distinguished physical scientists doubted the truth of the atomic hypothesis." Powerful tools became available to explore the atoms beyond "the outer electronic part of the atom." "These techniques show that atoms are not, in the literal Greek sense of the word, atoms at all. That is, they are not indivisible and immutable." The atomic nucleus was discovered, but this again was found to be not atomic in the literal sense. The neutrons and protons discovered in the nucleus were found to be "bound together by complex, predominantly attractive forces."

"A great deal still remains to be learned about nuclear structure and behavior."

"No particles of ordinary matter—and indeed none that can be made from it—are unchangeable. All particles can appear or disappear under proper conditions. Many can change into each other, though the rules of the game limit this play. Protons can turn into neutrons, neutrons into protons, and both can turn into quite different particles."

"Our new atomic menagerie of thirty particles consists of the electron, the proton and the neutron and their electrically opposite counterparts or anti-particles. Additionally we know of nine other groups." It is not known if the 30 particles complete the list. "We may compare our present state of knowledge with that of nineteenth century chemistry. . . ."

Two views of how "an understanding of fundamental particles may be attained," are being discussed. "If our history is any guide, our guesses as to the future of physics will turn out not to have been very clever."

"Is Science Enough?"

Certain of the writings of Rufus Jones, who taught philosophy for many years at Haverford College, were arranged under the title above in a chapter in an anthology, *Rufus Jones Speaks To Our Time* (New York, The Macmillan Co., 1951), edited by Harry Emerson Fosdick.

"The scientific temper has inevitably produced, by slow and almost unnoticed influences, a subtle change of outlook which has affected every aspect of human life," wrote Professor Jones in a passage quoted from his *A Preface to Christian Faith in a New Age* (Macmillan, 1932). "To hosts of experts and to multitudes of young students, the scientific method has come to be thought of as the only way of approach to truth and reality that is worthy of respect."

"This situation has brought a narrowing of the range of life and thought which amounts in its limitations to a real tragedy. The first limitation comes from an unnecessary narrowing of the scope and meaning of knowledge! It seems strange that any person who has considered the full rich nature of human experience should conclude that the only method of explanation employed by exact science can reveal the truth of things. Some of the most marvelous perceivers of reality that have ever lived, the poets and the artists of the race, without reflectively understanding or explaining through causes and formulas, have come very close to the heart of things. We could hardly live without their type of knowledge. . . .

"A scientific method unaided" does not "give a completely intelligible explanation of the things which it reports and describes. It cannot deal with ultimate origins or goals. If there are other positive ways of approach to such realities, or if there are inescapable implications of a spiritual order no less real than the visible one, science has no right to close the door to it, and it has no dominion over it. . . .

"Science has no magic key which can unlock all the realms of the universe. . . . Science has no legitimate method by which it could deprive man, if it would, of the reality of the spiritual. . . . The mind is its own kingdom, and can find its own correspondences and relationships. . . . The tap-root of religion is to be found in the nature of the human mind itself, and its true environment which is an order of realities that fits the deepest nature of man's mind."

"We are familiar with two ways of dealing with the nature of things: (1) the method of observation and exact description from the outside, the spectator method, and (2) the method of vital experience—discovery of reality by living your way into the heart of things," Rufus Jones wrote in a quotation given from *The Radiant Life* (Macmillan, 1944). "But the method of science . . . has been so successful that for many persons it has absorbed the whole field. . . . And that, I think, lies at the heart of our world tragedy. . . . The only solution of this *impasse* is certainly not to give up the scientific method, but to bring up in proper balance the true, rich, rounded appreciation of life itself, with its own sure springs and sources of direct experience."

"Has Science Replaced Religion?"

"Does religion matter? How? Why? Can one be scientific without giving up his religious faith?" These are the questions discussed by Edward LeRoy Long, Jr., in a Haddam House Book, *Science and Christian Faith* (New York, Association Press, 1950. $1.75). He thinks that one of the commonest questions among the people of our time is the one quoted in our title above. The subtitle of the book is "A Study in Partnership." The author

taught physics at Rensselaer Polytechnic Institute and later became a minister of the Presbyterian Church in the U. S. A., after study at Union Theological Seminary, New York. The book is dedicated to the faculties of Rensselaer and Union under whom the author learned to appreciate "something of the discipline of the scientific method and the richness of the Christian faith."

"The Rise of Science," and "The Religion of Science" are first discussed. There has arisen a "religion of science" which challenges religion. This is called "scientism" and it "competes with religion since it denies religion in the name of science." Many today confuse "the faith of scientism with science." "It is not science that opposes religion, but the philosophy of scientism that sets science and religion in opposition to each other."

Further, there is a "cult of technics," which is "scientism turned into a way of life." This cult has become "religious in character since it propagandizes itself, like any religion, by emotional and personal contact between its members and new converts." Its slogan is to the effect that philosophers and theologians talk and get nowhere while "scientists deal with facts and get things done."

Mr. Long then considers "The Role and Boundaries of Science," quoting a number of mature scientists who recognize the limitations of science and technology. Here it is made plain that the sophisticated students of science speak differently from "lay enthusiasts of science."

The functions of religion as interpretation and evaluation are next considered. Religion thus has "an essential role in human life."

The author concludes by regarding science and religion "as two unique, yet complementary types of knowing." "Science and religion are not identical; no help is had by equating them." They are "functionally different but equally essential." "They both seek truth. . . ."

"Science and religion are in partnership not only in the constructive search for truth but in their criticism of each other. . . ."

"However, the religious question is always primary, the religious category always ultimate. . . . Commitment is more ultimate than skill. . . . Redemption is more ultimate than progress."

The religious person of our time is, however, required also to consider, "How can the concrete contributions of scientific knowledge become a part of Christian conviction about the meaning of life."

"Christian Faith and Natural Science"

"Cosmic Encounter: Christian Faith and Natural Science" is the theme of *The Christian Scholar,* 257 Fourth Avenue, New York 10, N. Y., September, 1958. It is, writes the editor, for the most part "the work of scientists themselves, even at the planning stages." It is also recalled that "the suggestion that religion and science bear a relation to one another has traditionally served the role of setting off heated debate." "The warfare of science and religion" is a term deeply implanted on the memory of informed people of the western world. Also, it is often stated that science won and the church lost.

"Does this then mean that religion and science bear no continuing relation to one another? Does it mean that the dialogue between Christianity and the natural sciences has ended or that there is nothing left to talk about?"

The triumph of science is "part of the story," continues the Editor's Preface. "It appears, however, that today once again, as in some other selected moments of intellectual history, there are those who, as historians, are going back over the heritage of the sciences and are finding that the soil was prepared for them by basic Christian affirmations, though this soil had at times to be tilled by scientists outside the church and even against the church. . . . Basic historical research, intellectual reconstruction, and realism about this movement in human history combine to make our initial suggestion of a relation between science and Christianity a new possibility today. . . . There are those who have accepted the end of the period of warfare and have already begun to write new chapters in a positive relationship."

"This is the immediate background of the . . . issue of *The Christian Scholar.*" Among the contributions are: "The Challenge of the New Cosmology," by Donald H. Andrews of the Johns Hopkins University; "Man's Idea of Nature," by Michael B. Foster of Oxford University; "Fideistic and Scientific Methods," by Mary C. Rose of Goucher College; "On Relating Science and Religion," by Harold K. Schilling of Pennsylvania State University. A bibliography on science and religion containing 46 titles carefully annotated is published.

Institute on Religion in an Age of Science

The Institute on Religion in an Age of Science, organized in 1953 by a group of professional people in religion and science, is described by Ralph Burhoe, the secretary, in an article in *The Christian Scholar,* 257 Fourth Avenue, New York 10, N. Y., September, 1958. The Institute has held five annual summer conferences on Star Island "off the Atlantic Coast on the boundary of Maine and New Hampshire." Its activities "are limited to occasional, voluntary gatherings."

Among Mr. Burhoe's comments are the following:

"The founders of the Institute on Religion in an Age of Science believe they see a new break-through to solution of the centuries-old problem of accommodating the religious tradition to the new knowledge, a break-through that is provided by recent developments in the sciences themselves. It appears to some of us as though a true harmony of the religious gospels with modern science is being opened up particularly by the new philosophy of science, the new analysis of the nature of knowing and the nature of reality or being, as well as by some recent positive justification of certain religious ideas by the sciences. . . .

"It is our opinion that the most rapid progress toward a revival of more effective belief in some of the great spiritual teachings of religion required for the peace and survival of man in this new age can be made by seeking a very close integration with contemporary science."

On an Open Universe

An editorial note in *The Saturday Review,* New York, describes an article by Edgar Ansel Mowrer as a defense of "the Open Universe, where a cosmic principle of surprise makes free will possible" ("The Open Universe," April 19, 1958). Mr. Mowrer, lecturer and writer on politics, sums up his readings in science and philosophy, revealing that as a college student he threw himself "into philosophy as wholeheartedly as others into sports or campus activities."

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He takes up J. Robert Oppenheimer's question, " 'Will this world, with its variety, its un-understood numbers, ever yield to an ordered description, simple and necessary?' " Mr. Mowrer sums up: "Among the professionals are both passionate affirmers and passionate doubters of that great goal of science. . . . The history of thought reveals both attitudes from the beginning."

"Clearly, man is conscious of two types of experience. One of them responds wonderfully to observation and logic, particularly mathematical logic, and points to an intelligible world. The other has its own laws, essentially freedom, spontaneity and purpose, and cannot be so systematized.

"Since both systems are genuine, both can claim validity. In practice, nobody has much difficulty in leaping from the one to the other. Yet they point to radically different worlds and, so long as they remain separate, prevent any final conclusion as to the nature of reality."

"One finds champions of the Open Universe in many climes and countries. . . . Belief in an open universe, while critical of dogmatism, wonderfully widens the field of the *imaginatively possible*. By its candid acceptance of rational opposites, it frees the thinker to consider the most diverse explanations of things. . . .

"There may be more 'universes' of incredibly tenuous 'material' and different conditions interpenetrating this one. There may be other types of consciousness than present man's 'waking sanity' and other doors to knowledge than the discursive human reason. Dream and trance, second sight and prophetic vision, religious grace and mystical rapture—these may at some point become normal experience. Insight, intuition, psychic 'flashes' may become as respectable as smelling or hearing.

"Or again they may not. For if this were certain, the universe would no longer be so open. Even determinists may, by some twist of fate, turn out to be *right for a time*, a given place, and a certain class of events."

"The Validity of Non-Scientific Experience"

"We do not help by asking our children to spell God with nothing but the consonants of science," Wallace Stegner, professor of English at Stanford University writes in an article, "One Way to Spell MAN," in *The Saturday Review*, New York, May 24, 1958. It is a revision of an address given before the National Council of Teachers of English. "What anyone who speaks for art must be prepared to assert is the validity of non-scientific experience and the seriousness of non-verifiable insight."

In these days the cry is for more engineers, more mathematicians, and it appears that many believe that science will soon render art and literature unnecessary. Professor Stegner submits: "Science does not represent a system that will ultimately freeze art . . . out, but a method that supplements, and will always need supplementing by, the artist's ancient and unverifiable insights. There are questions that science not only cannot answer but doesn't know how to ask: there are kinds of truth with which it should not concern itself, and which, if it does concern itself with them, go dead on its hands."

"At their most creative edge, science and art both represent original questionings, pure research, and both rely upon a galvanizing and originating intuition. It is in their proofs that they differ. . . .

"And when a science and an art accost the same materials, the same apparent problems, it becomes very clear that they ask a different kind of question. . . . For it is of the essence of art that it is different things to different people. Within certain fluid boundaries of general meaning and feeling a writer is, as Robert Frost has said, entitled to anything a reader can find in him. . . .

"Literature has become for many of us, as it became for the father of William Butler Yeats and many of his generation, the source of wisdom and the receptacle of values. . . .

"Who will deny that literature can bring us truths; real truths, truths in solution, buried in their contexts, embedded and implicit in their created worlds, truths exemplified, unabstracted, concrete, demanding our participation. The truths of literature possesses an enduring ability to satisfy or at least allay human questioning, and they have every right to be called profound, though work and process and maker and response are all outside the possibility of full test or measurement. . . .

"It cannot be said too often that there is no single explanation for a poem or story or novel, nor is explanation necessarily understanding, nor is understanding necessarily enjoyment. . . . What is vital is the aesthetic experience, never quite communicable, a collaborative act. . . .

"Literature, alive, gets its strength from the sense it communicates of intimate acquaintance and fellowship, from our acknowledgment, in response to the work of art's illumination, of things as they are."

"The Scientist Is Like the Artist and Mystic"

It is false to say that "there are two ways of looking at events, scientifically and emotionally," Philip Siekevitz, a biochemist on the staff of the Rockefeller Institute for Medical Research, writes in an article, "A New Ethics for Science," in *The Nation*, New York, March 15, 1958.

"Most scientists work," he explains, in the presence of "a great body of scientific work which has been 'proven true' in that the facts uncovered are able to co-exist in a logical consistent manner." "There also exists—in the air, so to speak—a feeling of what is important, of what lines of research one should work on in order to get the most outstanding results. . . . The scientist selects a problem, then, in terms of what he already knows, and he designs his experiments in order to find answers which can be readily understood."

He is "almost fanatically attached to the self-contained truth which is shown by the experimental facts and results. He is fiercely partisan both in defending his way of getting at the truth and in defending his results from attack. He is so attached to this particular truth precisely because he has a burning emotional faith in the reliability of what he is doing to describe the real world (or at least the world which can be revealed to man to be real).

"Of course, all this makes for paradox: the highly rational world of experimentation rests upon nothing more nor less than an abiding faith in the rationale of the experimental approach. This faith rests upon no fact: it is based upon the proposition that man, being a part of the natural world, has precisely those thought processes which are compatible with drawing meaning from the dynamic processes of the world within and outside man. This faith is not any less in degree than that which adorns the mystic in his search for God, abides in the good man in his search for love, or perfects the artist in his reaching for beauty. Thus the scientist is like the artist and

mystic in the faith which he places in his power to describe truth according to his own light."

"Like all geniuses, the scientific variety performs by means unknown. By intuition, by absorbing quandaries for months and even years, his mind suddenly becomes a fire and out of the flames a phoenix arises and a new construction is erected. Again, in this respect, the scientific genius is the same as the genius in art and in literature."

"All see lights and visions which bridge the gulf between the known and the unknown. Every scientist goes through stages of brooding over some small difficulties, when suddenly, apropos of nothing, a new and striking relationship actually seems to formulate itself."

A Society for Social Responsibility in Science has been formed, Mr. Siekevitz notes, "consisting mostly of scientists who are pacifists and conscientious objectors," and urging an ethical code for scientists. While Mr. Siekevitz thinks that the "great bulk" of scientists will not affiliate with a group initiated by pacifists, he thinks their "idea of a code" is a good one. It should "assist in the self-regulation of individuals," and in the search for and maintenance of standards. "This is necessary, I think, to keep alive the ideas of disinterestedness which were formulated in the good old days when scientific research had not yet entered the power struggle of private groups and of government itself. It is necessary to preserve the integrity of scientists and the scientific method. It is necessary to insure that as far as it lies within the power of scientists, the benefits accruing from research be spread throughout the whole nation and the whole world."

"We owe it . . . to our seed and all their time ahead, that each of us scientists not part company from those poets and artists, saints and mystics, in whose realm we belong, that we be allowed to see our visions, and because of the nature of these visions, that what we see be used to benefit all men."

"Scientism and Religionism"

Following is the major portion of a statement under the above title signed by Lee A. Belford, chairman of the department of religious education, School of Education, New York University, appearing before a list of courses offered in 1958-59:

"Man has a natural inclination to fence off what he possesses and from within his own little enclosure to view everything else with disparagement. When the scientist develops a dogmatic ideology and erects barriers that stifle free inquiry, what is left is scientism, not science. When rigid creeds are established in religion with the presumption that all the final answers to all the big questions have already been answered, what is left is an idolatrous religion, or religionism. In both science and religion the axiom operates that, in order to find one's life, one must be willing to lose it. Without the possibility of having to surrender highly cherished conclusions, there can be no science. Unless it is maintained that God is able to speak to and transform individuals and their beliefs, religion becomes moribund and just another one of those enemies of true knowledge.

"We in America are frightened. It is shocking that the largest satellite bears the mark, 'Made in Russia.' The Russians seem to have kept pace with us in atomic fission and fusion. We want to catch up and even surpass the Russians in the sort of technological proficiency that made the satellites possible and we believe that we must work out some sort of moratorium on atomic destruction before it is too late. This means that we must develop our scientific program. But what about those human values that make our culture worth defending? What about religion and its domain? Will scientific study encroach upon and dominate everything else?

"The way to answer these questions is not by marking off certain areas in the humanities and defending them at any cost. The proper way is to ascertain what values are important and then to see that they are preserved both in science and the humanities. One of the important values worth preserving is the pursuit of truth. The true scientist works with the humble assumption that all his conclusions are only tentative, that he does not know the whole truth, but that it is possible to increase his knowledge and know more truth than he knew before. This corresponds with the Judaeo-Christian belief that there is a living God who created and sustains the universe, setting the sun, moon, and stars in their courses, and that the truth one discovers in nature is indeed truth come from God.

"If new truth is to be gained in any field, specialization is a necessity. No one can know all there is to know. Limits are set for any discipline, whether it be science, literature, or any other field. The biologist who, because of his proficiency in a single field, attempts to speak definitively in the field of manners and morals is guilty of scientism just as the bibliolatrist who attempts to give definitive answers in regard to physics and chemistry on the basis of the Bible is guilty of religionism.

"Obviously there are conflicts between scientism and religionism because both are ideologies concerned with defending themselves in areas in which they have no authority. The seventeenth-century church was wrong in its dogmatic insistence on the Ptolemaic conception of the universe and the nineteenth-century scientist was equally wrong in proclaiming the theory of evolution as the sole explanation of the meaning of human life. Galileo has been vindicated and evolution is accepted as the description of a process and not the master of life. The products of religionism and scientism, of trespassing in alien fields, are destined to defeat because they do not have sufficient foundation in truth to withstand the ravages of time.

"Admitting the necessity for specialization, is there no relationship between the astrophysicist in his study and the Chaucerian authority who spends countless days in dusty library stacks? The problem of unity and relatedness of separate entities has always haunted philosophers. Among the schools of philosophy, Pluralistic Naturalism deals satisfactorily with the various islands of knowledge and Idealism deals satisfactorily with the unity and oneness of truth, but no single school of philosophy can do justice to both the many and the one. Neither can science give the answer, for no one can comprehend the entirety of science and see the interrelationship of all the parts, particularly in the light of all the areas of deficient knowledge. Yet man cries out for oneness and unity and for a recognition of the importance of every discrete entity.

"In religion we are organized in different groups professing different beliefs. Can we do justice to the many different beliefs and still find unity in religion? If a religious group believes that it has all the truth, now and forever, there can be no 'Meeting' with other religious groups and all that is left is a pluralism of beliefs.

"The answer to the pluralism both in science and religion is faith, the faith of the saint and scientist, the

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faith that no one has the whole truth but only a portion of it. In both religion and science conclusions must remain tentative even though they demand conviction and loyalty until they have been proved erroneous. Both the saint and the scientist—and the scientist can be a saint—should scorn mendacity, lies, and hypocrisy.

"Life cannot be lived in compartments. A dogmatism derived from the worship of false gods and graven images, a dogmatism maintained in a closed cell, is as destructive to science as it is to religion because it delimits God, denying his transcendent reality as the source of all truth.

"For those of us who are concerned specifically with religion there is a special obligation to view the beliefs of others with a sense of reverence. Christians and Jews should seek to know each other and to learn how much they have in common. There are basic differences that will perhaps never be reconciled but the two religions share a common heritage in the meaning and purpose of man and in the interpretation of history."

"The Truth of Faith and Scientific Truth"

"Science has no right and no power to interfere with faith and faith has no power to interfere with science," Paul Tillich writes in *Dynamics of Faith* (New York, Harper and Brothers, World Perspectives Series, 1957. $2.75. Torchbook, paper edition, 1958. $.95).

"One dimension of meaning is not able to interfere with another dimension.

"If this is understood, the previous conflicts between faith and science appear in a quite different light. The conflict was actually not between faith and science but between a faith and a science each of which was not aware of its own valid dimension. When the representatives of faith impeded the beginning of modern astronomy they were not aware that the Christian symbols, although using the Aristotelian-Ptolemaic astronomy, were not tied up with this astronomy. . . . On the other hand, if representatives of modern physics reduce the whole of reality to the mechanical movement of the smallest particles of matter, denying the really real quality of life and mind, they express a faith. . . . In opposing this symbol of faith Christian faith is right.

"Science can conflict only with science, and faith only with faith; science which remains science cannot conflict with faith that remains faith. . . . The famous struggle between the theory of evolution and the theology of some Christian groups was not a struggle between science and faith, but between a science whose faith deprives man of his humanity and a faith whose expression was distorted by Biblical literalism. . .

"The truth of man's eternal meaning lies in a dimension other than the truth of adequate psychological concepts. Contemporary analytic or depth psychology has in many instances conflicted with pre-theological and theological expressions of faith. It is, however, not difficult in the statements of depth psychology to distinguish the more or less verified observations and hypotheses from assertions about man's nature and destiny which are clearly expressions of faith. . . . It is not always easy to distinguish the element of faith from the element of scientific hypothesis in a psychological assertion, but it is possible and often necessary.

"The distinction between the truth of faith and the truth of science leads to a warning, directed to theologians, not to use recent scientific discoveries to confirm the truth of faith. Microphysics have undercut some scientific hypotheses concerning the calculability of the universe. The theory of quantum and the principle of indeterminacy have had this effect. Immediately religious writers use these insights for the confirmation of their own ideas of human freedom, divine creativity, and miracles. But there is no justification for such a procedure at all, neither from the point of view of physics nor from the point of view of religion. The physical theories referred to have no direct relation to the infinitely complex phenomenon of human freedom, and the emission of power in quantums has no direct relation to the meaning of miracles. Theology, in using physical theories in this way, confuses the dimension of science with the dimension of faith. The truth of faith cannot be confirmed by the latest physical or biological or psychological discoveries—as it cannot be denied by them."

Emphases on TV

The year 1958 was a bad year for comedy, live drama and quiz shows on TV, and a good year for drunks, dancers, assassination, and conversation, John Crosby, radio and TV critic for the *New York Herald Tribune*, writes in that paper, January 12, 1959. The word religion does not appear in his comprehensive review.

The quiz shows "blew up in their owners' faces," the comedians tried to come back but fell flat on their faces. [One prominent comedian has remarked in another connection that he now has to make a living telling jokes about his wife—it is, he says, the only safe subject the sponsors will tolerate.]

Conversations among celebrated talkers "came back." "Maybe it was just a temporary phenomenon but for a moment conversation flourished, as it hasn't since the days of the 18th century coffee houses." . . . Listeners "who had forgotten how to talk watching television now said how nice it was on TV. This could lead to people taking up talk again and, of course, turning the set off to do so. . . . The talk shows had those great lost qualities that TV started with—spontaneity and unexpectedness."

Recent events in TV are summed up by quoting Abel Green in *Variety:* "'A national disenchantment has set in with television.'"

Adlai Stevenson on Soviet Life

Adlai E. Stevenson has compared Russian life on a recent visit with what he saw in the Soviet Union 32 years ago in a series of articles appearing in *The New York Times*. We review briefly the seventh instalment appearing November 18, 1958.

The big change is in the degree of industrialization. "Overtake America" is the slogan of all who direct the Soviet industrial development. There are great hydroelectric projects.

Peasant Russia is still much in evidence. On the banks of the Volga "old peasants sold eggs and berries, munched black bread and dried fish, and looked like characters out of Tolstoy."

Both the old and the new are now authentic parts of Russia. Mr. Stevenson thinks, however, "we will do well to think of it in terms of the jet airliners" and "the engineer sons rather than the peasant fathers."

Many women are in industry. They mend roads, forge steel, and make machine tools. Some of the plant managers are highly paid. One said: "I make a great deal of money."